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by various philosophers, though hitherto by relatively few scientific men.

It is evident on closer consideration that the existence and peculiarities of organisms must become completely unintelligible *except* on the assumption of a rigid and unvarying uniformity in the essential character of the processes taking place in living matter. The existence of material systems of such extreme complexity, which nevertheless maintain a stable existence and act in a manner which is uniform and within limits predictable—so that each human individual has a definite personal character—is in fact the most convincing proof that could be asked of the uniformity and invariability, as regards both their nature and their interconnections, of the innumerable substances, conditions and processes underlying the vital manifestations. Not only is the assumption of an extra-physical entelechy unnecessary, but it renders more difficult instead of easier the task of biological analysis, since it introduces a factor whose operation is *ex hypothesi* inconstant and unpredictable, and hence incompatible with the stability that vital conditions require. The assertion of Bergson that the living organism is characterized by a maximum of indeterminism⁵ makes the organic mechanism completely unintelligible, and to a physiologist seems almost the precise inverse of the truth. It is evident that in any physiological process any even momentary variation or deviation from a constant physico-chemical mode of action—say any inconstancy in the law of mass-action—would derange the whole interdependent system of processes, and render continued life impossible. The organism constitutes in fact the most impressive illustration that nature offers of the unfailing constancy of natural processes. The course of embryonic development is as essentially constant a process as the revolution of the moon about the earth, besides being far more complex; and this stability of the organic processes is fully as necessary to the continued existence of the species as is that of the inorganic processes. The usual forms of vitalism are hence inherently unin-

telligible and self-contradictory. It is certain that the advance of physical science, and especially of biological science, offers no escape from the deterministic dilemma. Experience shows everywhere not only interconnection between phenomena, but an invariability in the modes of interconnection. Constant repetition always exhibits itself as the order of nature, when the elementary constituents and processes are observed. The question inevitably arises: how then is it possible to reconcile teleology and the existence of will and purpose in nature with the existence of a physico-chemical determinism which appears the more rigid the further scientific analysis proceeds? Such problems are usually left on one side by scientific men, and this is not the place for their fuller discussion. Obviously, however, they require biological knowledge for their solution—if, indeed, they are ever to be solved; and one chief merit of the book under review is that it directs the attention of biologists once more to the importance and urgency of these questions.

RALPH S. LILLIE

The Interpretation of Dreams. By SIGMUND FREUD. Authorized translation of third edition by A. A. BRILL. New York, The Macmillan Co. 1913. Pp. xii + 510. Price \$4.

The "Interpretation of Dreams" is one chapter in Freud's theory of the neuroses, and was arrived at by the same methods which proved so useful in the study of the latter. This study revealed principles of even wider application than the sphere from which they were derived, and led to the author's illuminating psychopathology of every-day life. Similarly the dreams of normal people have become much more intelligible in the light of the analysis of psycho-neurotic symptoms and of the dreams of psycho-neurotic patients. Those who are familiar at first hand with the mechanisms of the neuroses and who are at home in the literature of the subject will find the "Interpretation of Dreams" an extremely stimulating monographic treatment of one aspect of a very large subject. To those who

⁵ "Creative Evolution," Chapter 2.

are not at home in the realm of the neuroses, and who take up this book in the atmosphere of the study or the experimental laboratory and would try to correlate it with the psychological data with which they usually work, the book is apt to be startling, unconvincing, repellent. The latter would have no difficulty in finding easy openings for criticism, both as regards method and form of presentation. The criticisms which have been brought forward against Freud's whole theory of the neuroses will no doubt be brought up in relation to this book, to the effect that it is largely a question of assumptions, ingenious but far-fetched hypotheses, and unconvincing arguments lacking proof. As to what proof actually consists in hostile critics are apt to be discreetly silent. It must be remembered that the type of demonstration appropriate to one topic may be quite out of place in relation to another; the satisfactory proof of a paleontological thesis is something very different from a mathematical demonstration. The proof that a certain piece of flint is really an arrow-head and not a mere casual product of nature consists in showing its place in a large series, and the extent of that series, which the individual requires in order to be convinced, will largely depend upon the attitude of the individual. So the extent of the series of data required to convince a reader of the truth of certain principles as to the neuroses and dream interpretation will depend very largely on certain personal factors. The presentation of material must necessarily be comparatively limited and much depends on what the reader can himself supply to supplement the data of the book; if he should have no relevant data at his command then the whole theory of dream interpretation may seem highly artificial. Any one with wide experience must admit the essential truth of certain general principles, while reserving judgment on the conclusiveness of certain detailed interpretations.

The method employed by the author in the interpretation of the dream is that of free association, a method which he found useful in his psycho-analytic work. After the first chapter, which deals with the literature on

dreams, Freud presents us an example of his method of interpretation of a dream, and in the succeeding chapters he defends his thesis that the dream is essentially the fulfilment of a wish: "The dream is the (disguised) fulfilment of a (suppressed; repressed) wish." The term wish must not be taken in too crude a manner, but is used to represent a variety of vague strivings and longings which are dynamic factors that frequently escape the notice of clear consciousness. The author demonstrates conclusively that dreams frequently represent wishes in an undisguised form, and that they often represent wishes in a more or less distorted manner. But he goes further; he maintains that the dream *always* represents the fulfilment of a wish. In two examples which the author quotes, the fact that the dream represents the opposite of the fulfilment of a wish is interpreted as showing that the patients desired to prove that Freud was wrong in his theory of the nature of dreams. This is one example of the subtlety of the author's argument which never leaves him at a loss, but which, on the other hand, is more ingenious than convincing. The argument, too, would be more satisfactory if the patient who wished to refute Freud dreamed that she was dreaming. The fifth chapter (pp. 138 to 259) is devoted to an analysis of the actual stuff of which our dreams are made, and the sources from which the material comes. The important thing is that behind the trivial and absurd manifest dream content, thoughts of serious personal significance are always found at work. Memories of childhood experiences here play an enormously important rôle. In this connection Freud takes up the analysis of certain typical dreams and gives many examples of the symbolism which occurs in dreams. His statements are frequently dogmatic, *e. g.*, with regard to the meaning of dreams about landscapes and localities of familiar appearance (p. 242). On the other hand, Freud himself draws the line at some of the interpretations advanced by Stekel. His criticism of his pupil is not altogether inapplicable to his own product: "These interpretations

seem neither sufficiently verified nor of general validity, although the interpretation in individual cases can generally be recognized as probable." In the sixth chapter the author discusses the manner in which the stuff of our dreams is woven into the final tissue, and he describes in detail the four main processes, viz., condensation, displacement, dramatization, secondary elaboration. In the final chapter, the obscurity of which is somewhat increased in the translation, the psychology of the dream activities is discussed in a general way. For this purpose Freud constructs a scheme of psychological activity which is extremely interesting and suggestive, but which on the other hand is peculiarly artificial.

Since its publication in the first German edition this book has met with a very mixed reception. The bible of the author's disciples, it has been derided by his opponents. Any person who has had to deal seriously with the problems of the psycho-neuroses and of the disordered mind in general, and who has been impressed with the value of the psychopathological principles derived from Freud's contributions for the general development of psychological and allied studies, will look upon this book as a serious contribution to a most important field. The more knowledge he has of the actual facts the slower will he be in dogmatically rejecting even those statements of the author which are unconvincing and apparently rather extreme. He probably is already firmly convinced of the truth of many doctrines which at an earlier stage of his own work he looked upon as equally far-fetched and perhaps even more absurd.

C. MACFIE CAMPBELL

Tables Annuelles de Constants et Données Numériques de Chimie, de Physique et de Technologie. Published under the patronage of the International Association of Academies by the international committee named by the Seventh Congress of Applied Chemistry (London, June 2, 1909). Vol. I. for 1910. Gauthier-Villars, Paris, University of Chicago Press. 1911. Quarto. Pp. xxxix + 727.

This first volume of the annual tables and numerical constants, published under the auspices of an international committee representing twenty-one countries, shows the prodigious undertaking assumed by the committee. The list of collaborators comprises no less than thirty-one distinguished scientific authorities, and the number of abstractors of scientific journals about three times as many. The book is divided into forty-six chapters, and the table of contents covers eighteen pages in French, German, English and Italian.

The material is admirably arranged, and to every table are appended the name of the investigator and a reference to the original memoir. Thus, every item may be verified by consulting the original publication. Every scientific worker in the fields covered by this volume has in condensed form the results of allied investigations and information relative to the original sources. Moreover, the general secretary offers to assist in obtaining fuller information concerning memoirs in journals not accessible to the reader.

It is difficult to conceive of any compilation of scientific data better adapted to furnish information to the investigator in physics, chemistry and technology. A close inspection of the contents of this volume reveals a wealth of data and a variety of subjects that command not only respect but admiration. The investigator has in this book an invaluable adjunct to his reference library of scientific books and periodicals. It will broaden his view of the particular field of research in which he happens to be engaged, and will give him collateral information relative to many other allied subjects. The fulness of this information is indicated by the data relating to conductivity of electrolytes and electromotive forces, which cover forty-six large quarto pages. Under the first come specific conductivities, molecular conductivities, constants of electrolytic dissociation, transport numbers, coefficient of pressure of electrolytic conductivity, conductivity of electrolytes in solvents other than water, conduc-